UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/471,572	12/23/1999	KENNETH A. JONES	59896/JPW/AD	7623

7590 11/19/2002

JOHN P WHITE ESQ
COOPER & DUNHAM LLP
1185 AVENUE OF THE AMERICAS
NEW YORK, NY 10036

EXAMINER
MURPHY, JOSEPH F

ART UNIT	PAPER NUMBER
1646	10

DATE MAILED: 11/19/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/471,572	JONES ET AL.	
	Examiner	Art Unit	
	Joseph F Murphy	1646	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *8/12/2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *156-183* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *156-183* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Formal Matters

Claims 1-22 were cancelled, and new claims 156-183 were added in Paper No. 9, 8/12/2002. Claims 77, 141 and 156-183 are pending. Claims 77 and 141 stand withdrawn from consideration pursuant to 37 CFR 1.142(b).

Response to Amendment and Arguments

Applicant's arguments and amendments filed in Paper No. 9, 8/12/2002 have been fully considered, but they are persuasive in part.

The rejection of claims 1-22 under 35 USC § 112 second paragraph have been rendered moot by cancellation of the claims, and are thus withdrawn.

The rejection of claim 22 under 35 U.S.C. 102(b) as being anticipated by Maurice et al. (1993) has been rendered moot by cancellation of the claims, and are thus withdrawn.

The rejection of claims 1-22 under 35 USC § 112 first paragraph as lacking enablement have been rendered moot by cancellation of the claims, and are thus withdrawn.

Claim Rejections - 35 USC § 112 first paragraph

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The rejection of cancelled claim 6 has been applied to claim 159, which is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the

inventor(s), at the time the application was filed, had possession of the claimed invention, for reasons of record set forth in Paper No. 8, 2/8/2002.

Due to the limitation of "genomic DNA" recited in the claim, a determination of what the claim as a whole covers indicates that elements which are not particularly described, e.g. promoters, enhancers, untranslated regions and introns, are encompassed by this claim. There is no actual reduction to practice of the claimed invention, or complete detailed description of the structure. A biomolecular sequence described only by a functional characteristic, in this case an isolated genomic nucleic acid encoding a chimeric G protein, without any known or disclosed correlation between that function and the structure of the sequence is not a sufficient identifying characteristic. See University of California v. Eli Lilly and Co. 43 USPQ2d at 1406. There is no known or disclosed correlation between this function and the structure of the non-described regulatory elements and untranslated regions of the genomic DNA. Weighing all factors in view of the level of knowledge and skill in the art, one skilled in the art would not recognize from the disclosure that the Applicant was in possession of the claimed invention.

Applicant argues that the new claim does not cover those elements associated with genomic DNA such as promoters, enhancers, UTR's and introns, and that the new claim covers only coding sequence. However, a DNA can comprise promoters, enhancers, UTR's and introns and still consist of nucleotides which encode the chimeric G protein, since promoters, enhancers, UTR's and introns are not part of the coding sequence. Contrary to Applicant's arguments, this claim does not only cover the coding sequence, it still encompasses elements which are not particularly described, e.g. promoters, enhancers, untranslated regions and introns, thus the rejection is maintained.

The rejection of cancelled claims 1-22 have been applied to claims 156-183, which are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention, for reasons of record set forth in Paper No. 8, 2/8/2002. Applicant is directed to the Guidelines for the Examination of Patent Applications Under the 35 U.S.C. 112, ¶ 1 "Written Description" Requirement, Federal Register, Vol. 66, No. 4, pages 1099-1111, Friday January 5, 2001.

These are genus claims. According to the specification, the term variant means a protein having one or more amino acid substitutions, deletions, insertions and/or additions made to SEQ ID NO: 1. The specification and claim do not indicate what distinguishing attributes shared by the members of the genus. The specification and claim do not place any limit on the number of amino acid substitutions, deletions, insertions and/or additions that may be made to SEQ ID NO: 1. Thus, the scope of the claim includes numerous structural variants, and the genus is highly variant because a significant number of structural differences between genus members is permitted. Although the specification states that these types of changes are routinely done in the art, the specification and claim do not provide any guidance as to what changes should be made. Structural features that could distinguish compounds in the genus from others in the protein class are missing from the disclosure. No common structural attributes identify the members of the genus. The general knowledge and level of skill in the art do not supplement the omitted description because specific, not general, guidance is what is needed. Since the disclosure fails to describe the common attributes or characteristics that identify members of the genus, and

because the genus is highly variant, SEQ ID NO: 1 alone is insufficient to describe the genus. One of skill in the art would reasonably conclude that the disclosure fails to provide a representative number of species to describe the genus. Thus, applicant was not in possession of the claimed genus.

Applicant argues that several specific examples of chimeric $G_{\alpha q}$ proteins were provided in the specification. However, the written description requirement for a claimed genus may be satisfied through sufficient description of a representative number of species by actual reduction to practice, reduction to drawings, or by disclosure of relevant identifying characteristics, i.e. structure or other physical and/or chemical properties, by functional characteristics coupled with a known or disclosed correlation between structure and function structure, or by a combination of such identifying characteristics, sufficient to show the applicant was in possession of the claimed genus.

A "representative number of species" means that the species which are adequately described are representative of the entire genus. Thus, when there is substantial variation within a genus, one must describe a sufficient number of species to reflect the variation within the genus. What constitutes a "representative number" is an inverse function of the skill and knowledge in the art. Satisfactory disclosure of a "representative number" depends on whether one of skill in the art would recognize that applicant was in possession of the necessary common attributes or features of the elements possessed by the members of the genus in view of the species disclosed. In an unpredictable art, adequate written description of a genus which embraces widely variant species cannot be achieved by disclosing only one species within the genus. The unpredictability of the protein art was established in the rejection under 35 USC §

112 first paragraph in Paper No. 8, 2/8/2002. The claims are drawn to isolated nucleic acids encoding all invertebrate, including all mammalian, chimeric $G_{\alpha q}$ proteins which vary at least five, but less than twenty-one amino acids beginning at the C-terminal end. There is substantial variation within this genus, therefore one must describe a sufficient number of species to reflect the variation within the genus. Applicant has only taught chimeric Gaq protein comprising human Gaq/z5, C. elegans Gaq/z5 and C. elegans Gaq/z9. Given the unpredictability of the protein art, and the variation within the genus, this is not a sufficient number of species to reflect the variation within the genus.

Claim Rejections - 35 USC § 112 second paragraph

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 156-176, 179-183 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 156 is vague and indefinite in the recitation of "produces a $G_{\alpha q}$ second messenger response". The specification on page 29, lines 1-4 defines a "$G_{\alpha q}$ second messenger response" as one of a number of responses which are typically produced by activation of G protein heterotrimers containing $G_{\alpha q}$. However, G proteins upon activation bind to effectors which produce the second messenger response. It is not clear from the claim whether the chimeric $G_{\alpha q}$ protein is to bind an effector and induce a second messenger response, or whether the chimeric

$G_{\alpha q}$ protein is to produce a second messenger response itself in some manner. Claims 157-176, 179-183 are rejected insofar as they depend on the recitation of claim 156 of "produces a $G_{\alpha q}$ second messenger response"

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 156-183 are rejected under 35 U.S.C. 103(a) as being unpatentable over Conklin et al. in view of Milligan et al. (1999) and further in view of Silva et al. (1990).

Conklin et al. teaches that specific amino-acid residues at the C-termini of alpha-subunits can determine the abilities of individual G proteins to discriminate among specific subsets of receptors (page 27, column 2, first paragraph). Conklin et al. replaced C-terminal amino acids of alpha q with the corresponding residues of alpha i2 to create alpha q/alpha i2 chimaeras that can mediate stimulation of phospholipase C by receptors otherwise coupled exclusively to Gi (page

274, Figure 1). Conklin et al. also made chimeras in which the last five residues of Gαq were replaced by the corresponding amino acids of αz and αo (page 275, Figure 3a). These chimeras were tested in an assay which measured phospholipase C activity (page 275, Figure 3b). The DNA encoding these chimeric receptors was taught (page 274, Figure 1). The DNA coding for the chimeric construct of Gaq and the corresponding amino acids of αz was taught (page 274, Figure 1).

Conklin does not teach DNA encoding an invertebrate chimeric Gαq protein. Milligan et al. teaches that a wide range of chimaeric G protein alpha subunits have been produced in order to design a universal ligand-screening systems such that any GPCR can be screened using a common assay end-point. Milligan et al. teaches the use of chimeric yeast mammalian G proteins which increases the efficiency of signaling of many mammalian GPCR's in yeast (page 123, column 2, second paragraph). Milligan further teaches that the yeast pheromone response pathway will require the construction and co-expression of yeast G protein α subunit and mammalian Gα chimeras containing the receptor interaction C terminal regions of mammalian G protein (page 123, column 2, second paragraph). Milligan does not teach chimeric Gαq proteins from C. elegans. Silva et al. teaches the cloning of a G-protein α-subunit gene (page 484, Figure 1). Silva et al. teaches that nematodes are useful for studying G protein mutants, since they are less likely to be lethal. Therefore, it would have been obvious to one of skill in the art at the time the invention was made to make a chimeric Gα subunit as taught by Conklin et al. comprising a sequence from nematode, as taught by Silva et al. The motivation is provided in Milligan et al. who teaches that chimeric G protein alpha subunits need to be produced in order to design a

universal ligand-screening systems such that any GPCR can be screened using a common assay end-point.

Conclusion

No claim is allowed.

Advisory Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph F. Murphy whose telephone number is 703-305-7245. The examiner can normally be reached on M-F 7:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Yvonne Eyler can be reached on 703-308-6564. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-3014 for regular communications and 703-308-0294 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0196.

Joseph F. Murphy, Ph. D.
Patent Examiner
Art Unit 1646
November 12, 2002